

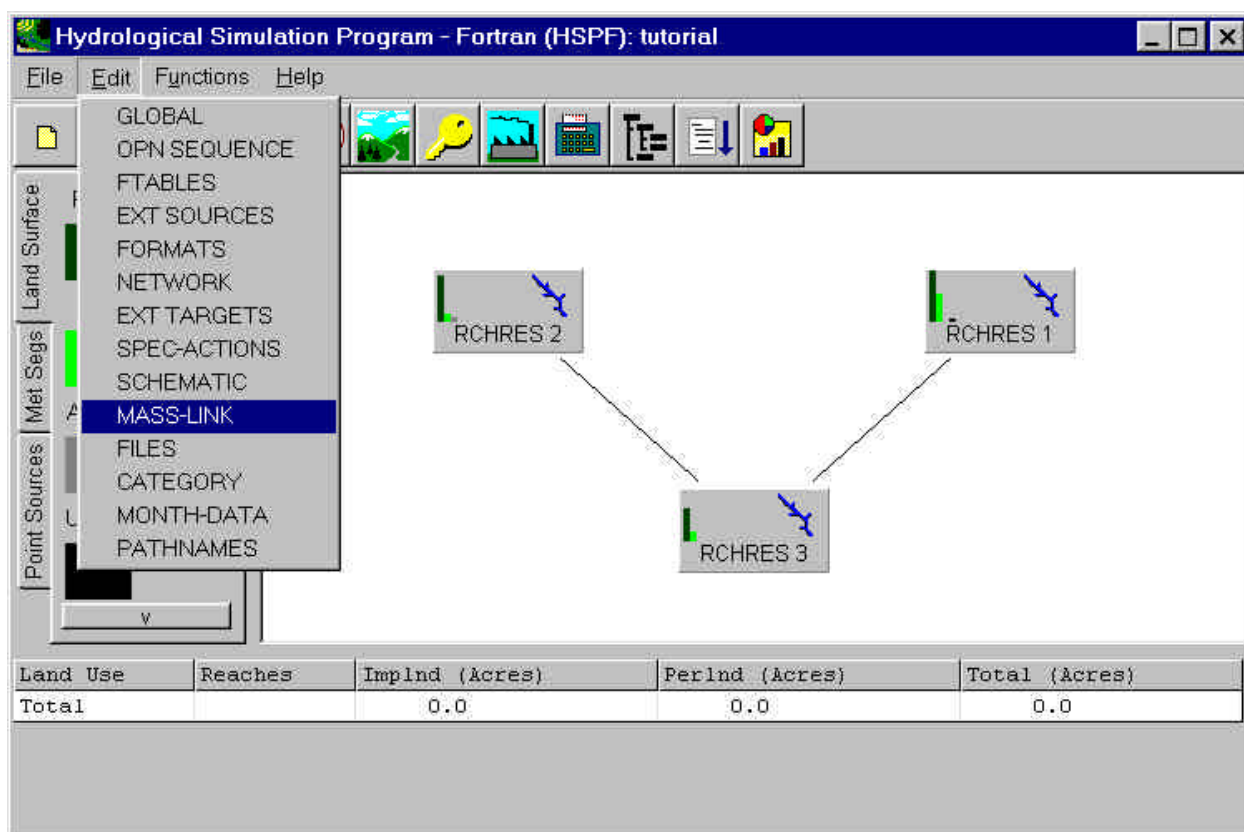
Lesson 6: Modeling a Watershed Management Practice

With a project active in WinHSPF, the user may wish to make significant changes in the HSPF input sequence and save this modified input sequence under a new WinHSPF project name. This situation might occur if the user is modeling a watershed management practice. This lesson demonstrates how to make changes to the project to model a sediment BMP and save the changes to a new WinHSPF project name. (An alternate way to add BMPs is through use of the BMP Editor. See the Best Management Practices Editor for more details.)

Watershed management practices can be modeled in HSPF using the BMPRAC operation. Adding a BMPRAC operation requires several steps, including adding the BMPRAC operation to the Operation Sequence block, adding the appropriate tables within the BMPRAC block, and adding the appropriate connections.

WinHSPF provides assistance in adding the BMPRAC operation and required BMPRAC tables, but the appropriate Mass-Links must already exist in the Mass-Link block. This tutorial assumes that the appropriate Mass-Links do not already exist.

The user must first add the necessary Mass-Links. From the main WinHSPF window, click on the **Edit** menu, and select the **Mass-Link** option.



The **Edit Mass-Link Block** window will appear.

Edit Mass-Link Block

Mass-Link Number: 2

Add New

VolNar	Grou	MemNar	MemSu	MemSu	MultFac	VolNar	Grou	MemNar	MemSu	MemSu
PERLN	PWA	PERO	0	0	0.08333	RCHR	INFL	IVOL	0	0
PERLN	PWT	PODOX	0	0	1	RCHR	INFL	OXIF	1	0
PERLN	PWT	POCO2	0	0	1	RCHR	INFL	OXIF	2	0
PERLN	PWT	POHT	0	0	1	RCHR	INFL	IHEAT	1	0
PERLN	PQU	POQUAI	1	0	1	RCHR	INFL	IDQAL	1	0
PERLN	PES	POPST	1	0	1	RCHR	INFL	IDQAL	1	0
PERLN	PES	SOSDP	1	0	1	RCHR	INFL	ISQAL	1	1
PERLN	PES	SOSDP	1	0	1	RCHR	INFL	ISQAL	2	1

SVOL: Operation-type of the source opn.

OK Cancel Apply Help Add Remove

Click the **Add New** button in the top right corner to add a new Mass-Link. A new Mass-Link will appear with no records in it.

Edit Mass-Link Block

Mass-Link Number: 4

Add New

VolNar	Grou	MemNar	MemSu	MemSu	MultFac	VolNar	Grou	MemNar	MemSu	MemSu
--------	------	--------	-------	-------	---------	--------	------	--------	-------	-------

SVOL: Operation-type of the source opn.

OK Cancel Apply Help Add Remove

Click the **Add** button to add a record to this Mass-Link.

Mass-Link Number: 4

Add New

VolName	Group	MemName	MemSul	MemSul	MultFac	VolName	Group	MemName	MemSul	MemSul

SVOL: Operation-type of the source opn.

OK Cancel Apply Help Add Remove

This new Mass-Link will be used for the BMPRAC to RCHRES connection. Double click in the left-most column and choose the BMPRAC operation. Click in the column to the right and enter '1' as the operation number. Proceed through the rest of the columns adding text as shown in the following image. When finished click the **Apply** button.

Mass-Link Number: 4

Add New

VolName	Group	MemName	MemS	MemS	MultFa	VolName	Group	MemName	MemS	MemS
BMPRA	ROFLOV	0	0	1		RCHRES	INFLOW	0	0	

TMEMS2: Target member name second subscript.

OK Cancel Apply Help Add Remove

The same process is needed for the PERLND to BMPRAC connection. Click the **Add New** button to add a new Mass-Link. A new Mass-Link will appear with no records in it. Click the **Add** button three times to add three records to this Mass-Link. Proceed through the rows and columns adding text as shown in the following image. When finished click the **Apply** button.

Edit Mass-Link Block

Mass-Link Number: 5

Add New

VolName	Group	MemName	MemSub	MemSub	MultiFac	VolName	Group	MemName	MemSub	MemSub
PERLND	SEDMNT	SOSED	0	0	1	BMPRAC	INFLOW	ISED	1	0
PERLND	SEDMNT	SOSED	0	0	1	BMPRAC	INFLOW	ISED	2	0
PERLND	SEDMNT	SOSED	0	0	1	BMPRAC	INFLOW	IHEAT	3	0

IMEMS2: Target member name second subscript.

OK Cancel Apply Help Add Remove

The same process is needed for the IMPLND to BMPRAC connection. Click the **Add New** button to add a new Mass-Link. A new Mass-Link will appear with no records in it. Click the **Add** button three times to add three records to this Mass-Link. Proceed through the rows and columns adding text as shown in the following image. When finished click the **OK** button to return to the main WinHSPF window.

Edit Mass-Link Block

Mass-Link Number: 6

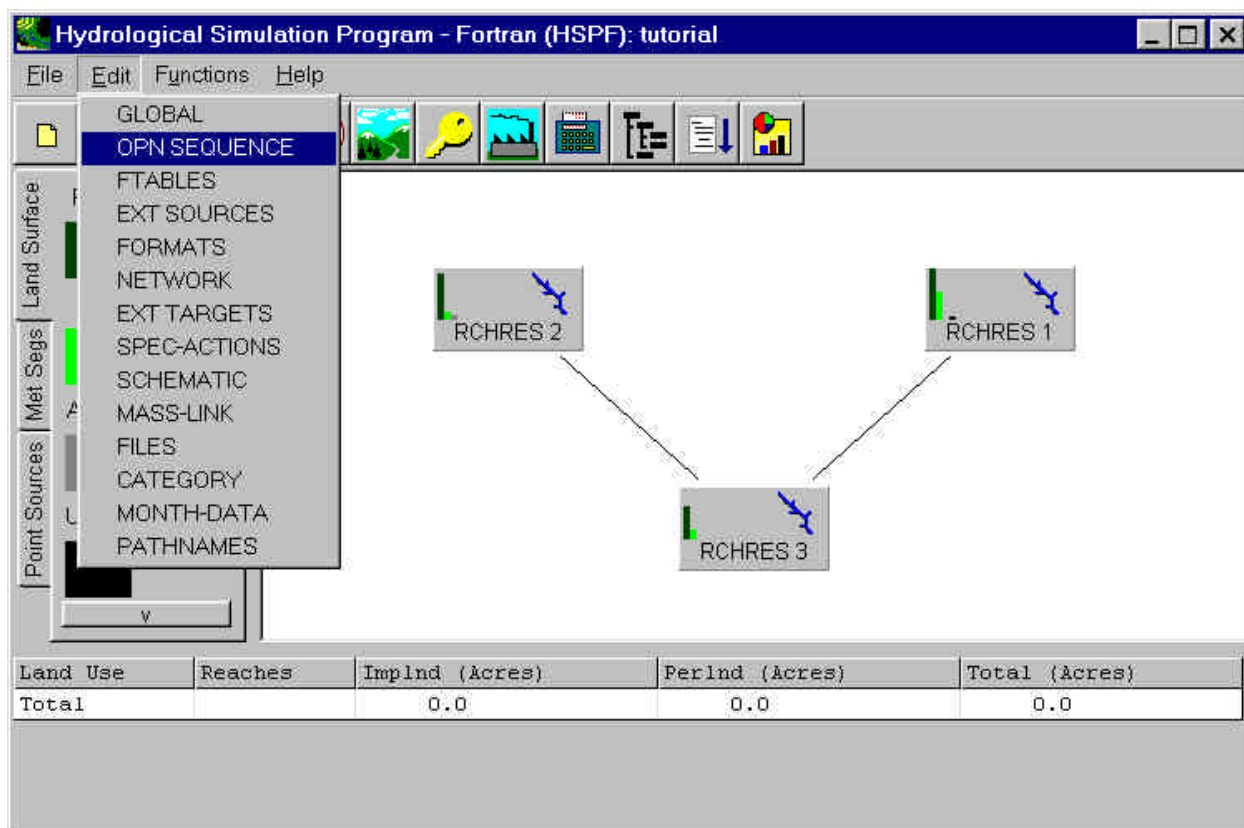
Add New

VolName	Group	MemName	MemSub	MemSub	MultiFac	VolName	Group	MemName	MemSub	MemSub
IMPLNC	SOLIDS	SOSLD	0	0	1	BMPRAC	INFLOW	ISED	1	0
IMPLNC	SOLIDS	SOSLD	0	0	1	BMPRAC	INFLOW	IHEAT	2	0
IMPLNC	SOLIDS	SOSLD	0	0	1	BMPRAC	INFLOW	ISED	3	0

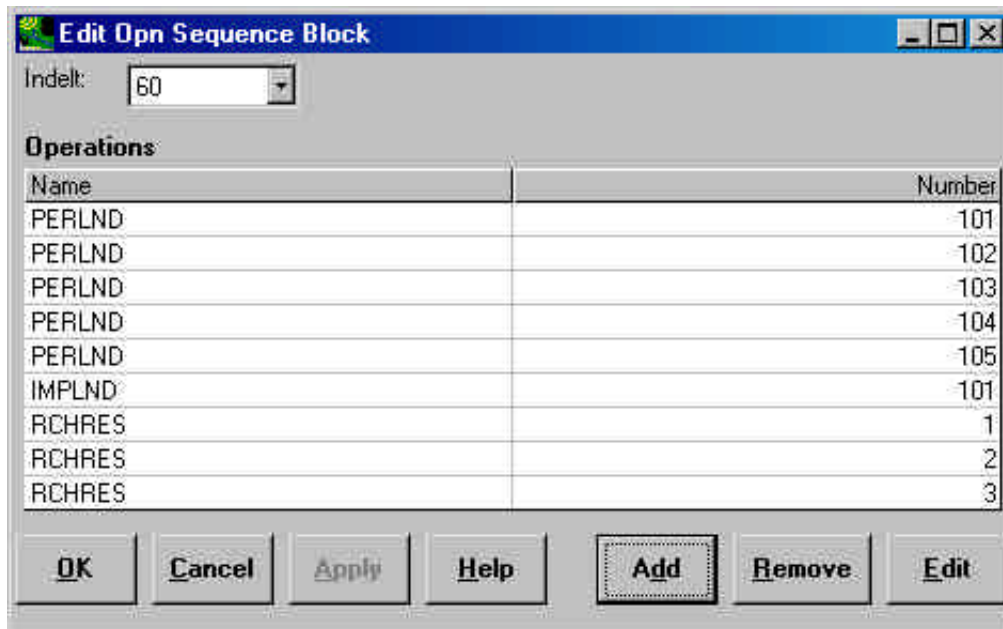
IMEMS2: Target member name second subscript.

OK Cancel Apply Help Add Remove

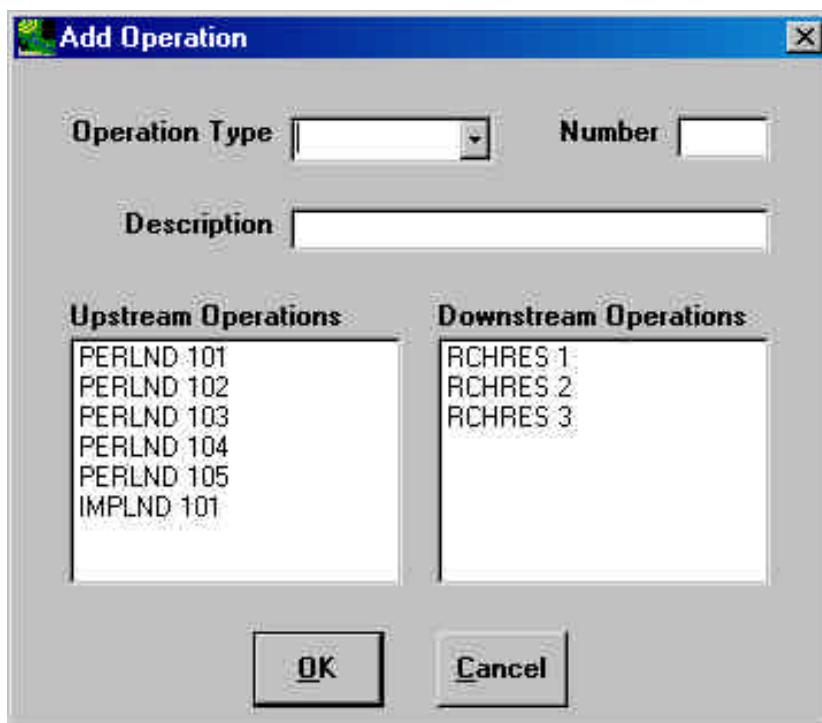
The Mass-Links have now been added, and the user may proceed to add the new operation. From the main WinHSPF window, click on the **Edit** menu, and select the **Opn Sequence** option.



The **Edit Opn Sequence Block** window will appear.

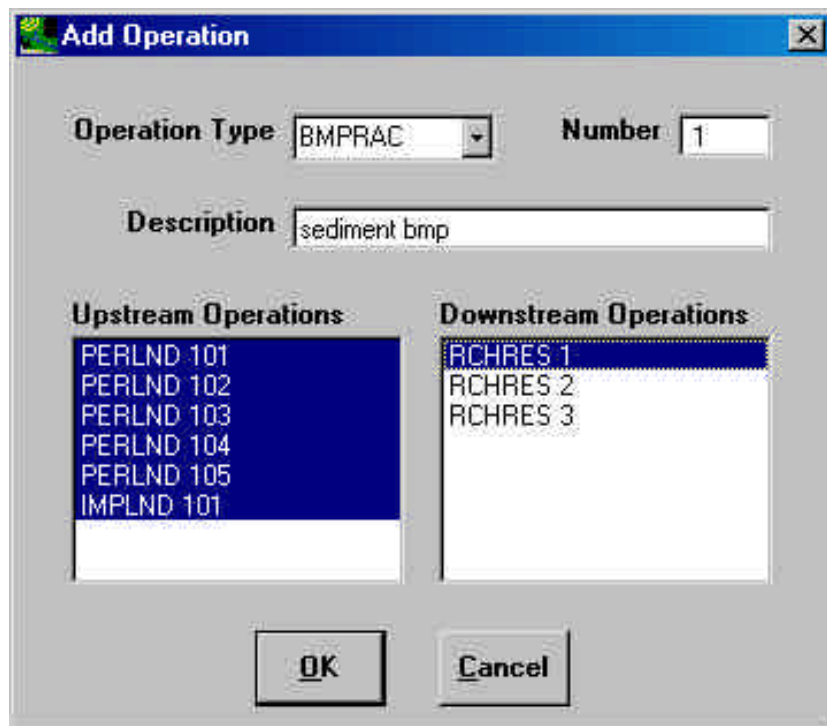


We will add the new Bmprac operation upstream of RCHRES 1. Click on the row containing RCHRES 1. Then click the **Add** button.

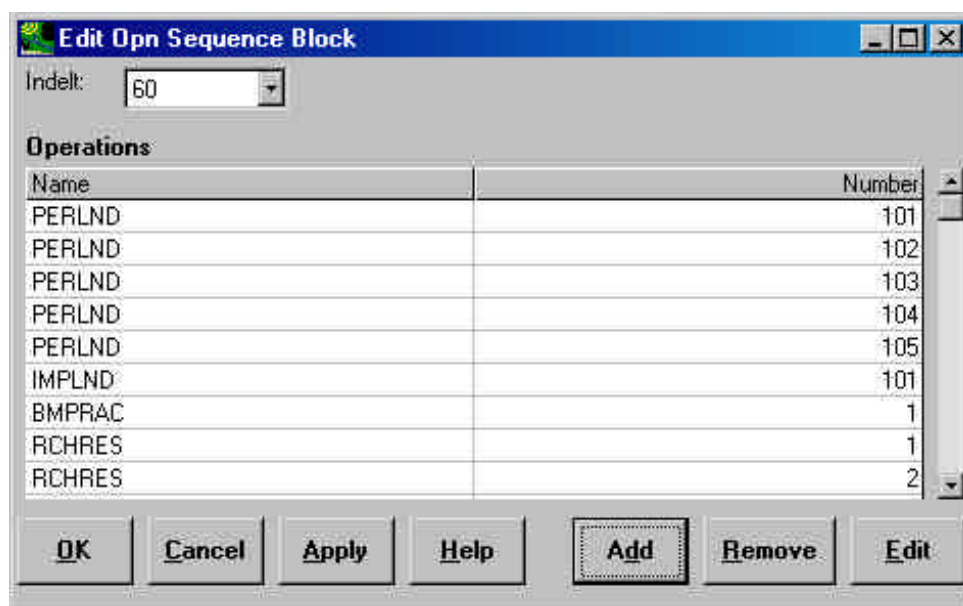


The **Add Operation** window will appear. Specify the parameters in this window as shown in the following image. Be sure to select 'Bmprac' as the operation type, '1' as the number, type 'sediment

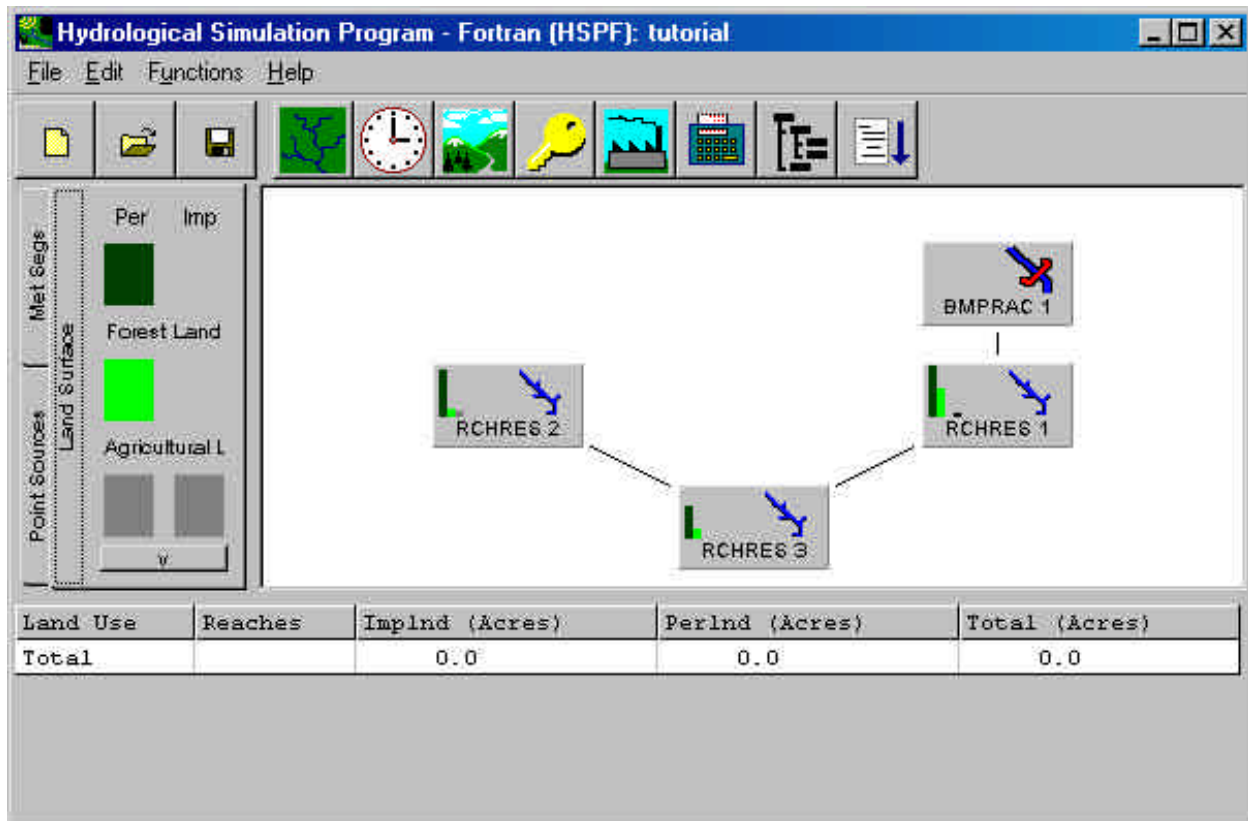
bmp' as the description, choose all upstream operations, and choose 'RCHRES 1' as the downstream operation. Then click the **OK** button.



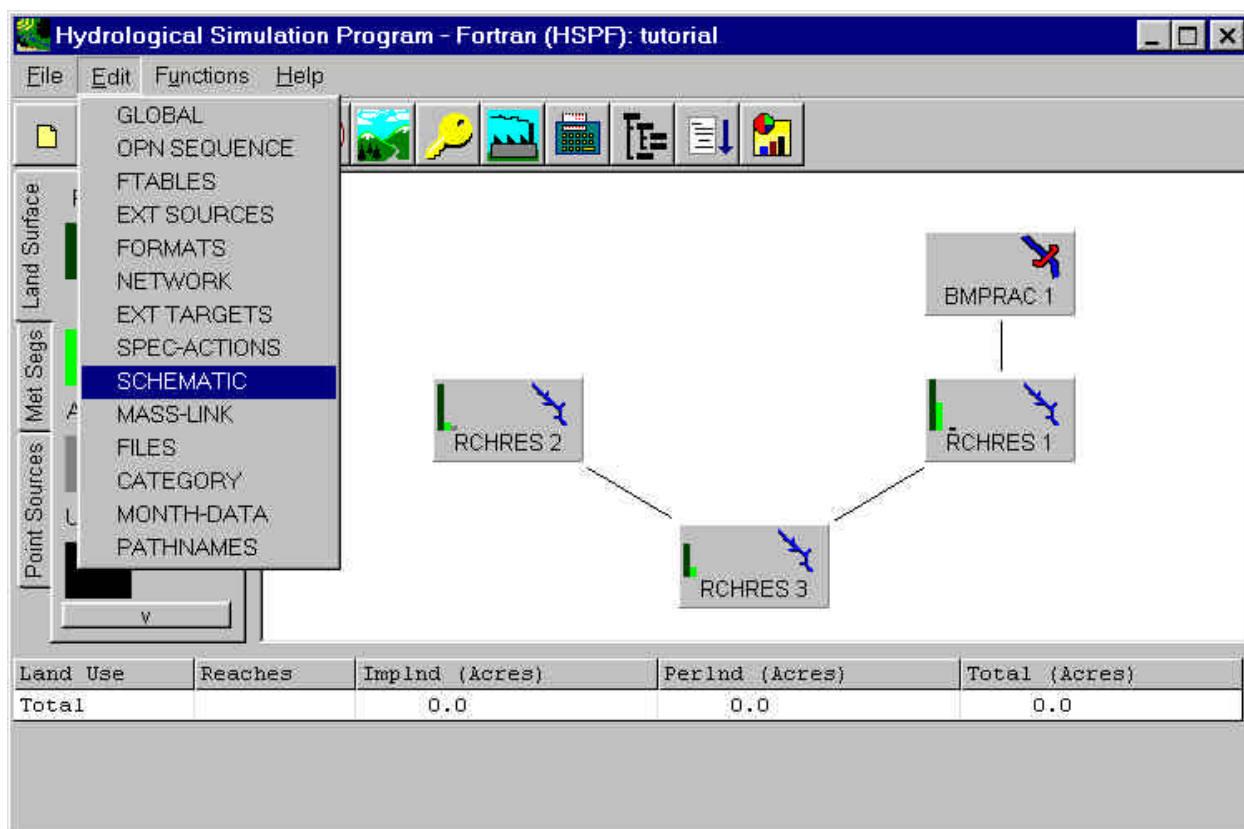
The new BMPRAC operation will appear in the **Edit Opn Sequence Block** window. Click **OK** to return the main WINHSPF window.



The watershed schematic in the main window now contains the new BMPRAC operation.



The new BMPRAC operation does not have any land area contributing to it yet. Click on the **Edit** menu, and select the **Schematic** option.

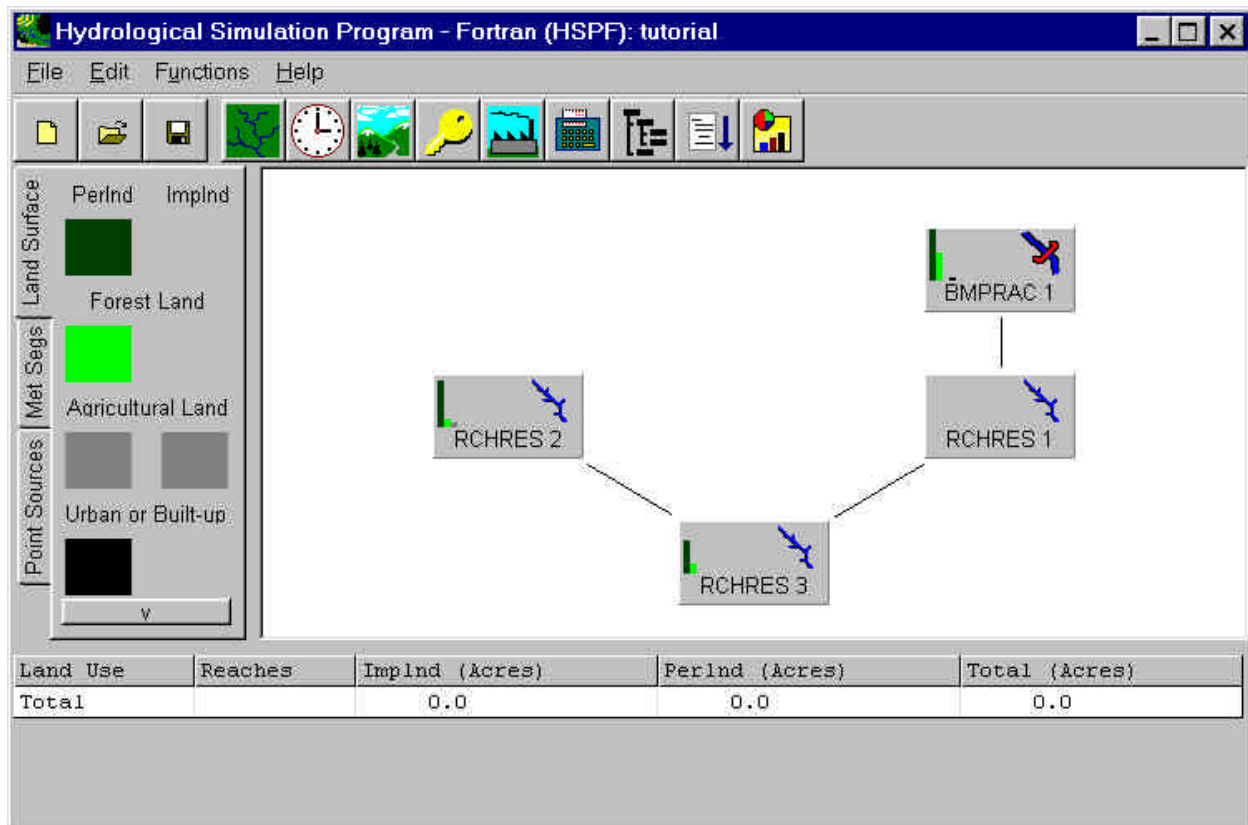


The **Edit Schematic Block** window will appear. Notice the number of acres of PERLND 101 contributing to RCHRES 1. Enter this number of acres in the **AreaFact** column of the PERLND 101 to BMPRAC 1 row. Then click on the PERLND 101 to RCHRES 1 record, and click on the **Remove** button to remove this record from the Schematic block. Proceed through the rest of the records contributing to BMPRAC 1, so that the Schematic block appears as follows. Then click the **OK** button to return to the main WinHSPF window.

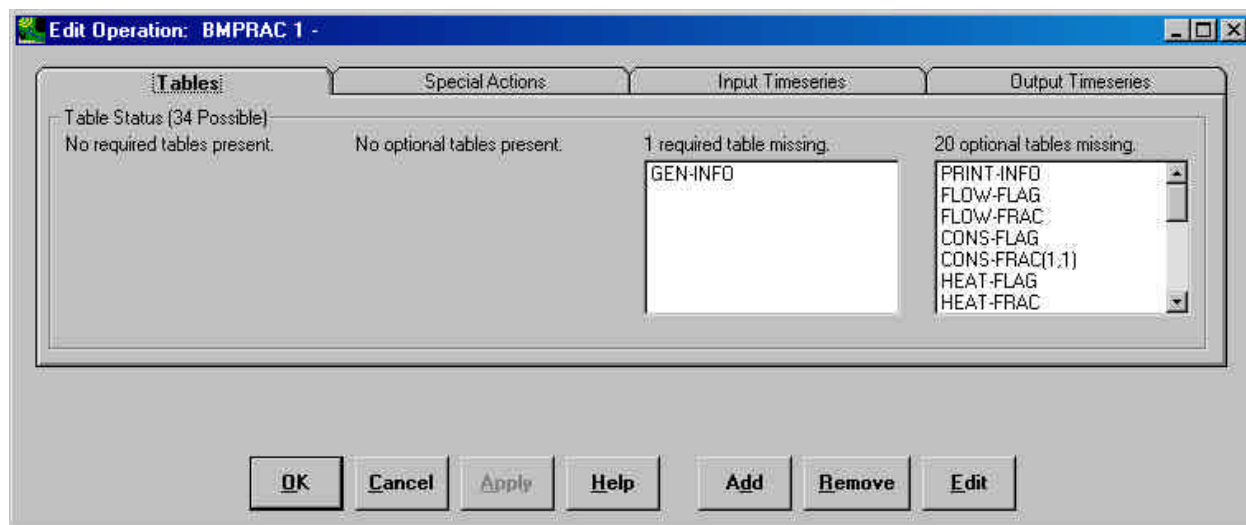
Edit SCHEMATIC Block					
VolName	VolId	AreaFact	VolName	VolId	MLId
PERLND	101	27228	BMPRAC	1	5
PERLND	102	13675	BMPRAC	1	5
PERLND	103	115	BMPRAC	1	5
PERLND	104	623	BMPRAC	1	5
PERLND	105	58	BMPRAC	1	5
IMPLND	101	115	BMPRAC	1	6
BMPRAC	1	1	RCHRES	1	4
PERLND	101	23472	RCHRES	2	2
PERLND	102	3104	RCHRES	2	2
PERLND	105	62	RCHRES	2	2
PERLND	103	759	RCHRES	2	2
IMPLND	101	759	RCHRES	2	1
PERLND	104	279	RCHRES	2	2
PERLND	101	16478	RCHRES	3	2
PERLND	102	4118	RCHRES	3	2
PERLND	104	327	RCHRES	3	2
PERLND	103	74	RCHRES	3	2

OK Cancel Apply Help Add Remove

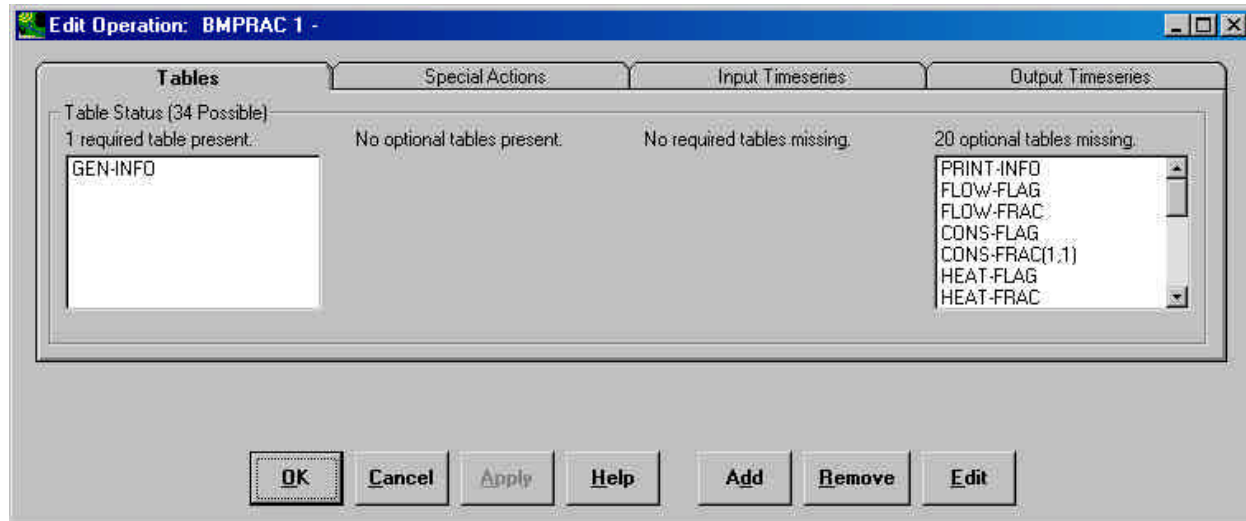
Notice in the watershed schematic that land area now contributes to BMPRAC 1.



The last step in adding the new management practice is to add the necessary tables to the BMPRAC block. Double-click on the BMPRAC 1 box in the watershed schematic. The **Edit Operation** window will appear for BMPRAC 1.



Notice that the required table 'GEN-INFO' is missing. Select the name 'GEN-INFO' and then click the **Add** button to add this table. The name 'GEN-INFO' will move to the list of tables that are present.



Select the name 'GEN-INFO' and then click the **Edit** button to edit this table. The **Edit BMPRAC:GEN-INFO** window will appear. The default values for this table are acceptable. Type in a

name for the BMPID and click the **OK** button to return to the **Edit Operation** window.

OpNum	BMPID	BMPTYP	NCONS	NGQUAL	IUNITS	OUNITS	PUNITE	PUNITM
1	sediment bmp	1	0	0	1	1	0	0

Table: GEN-INFO, General information for BMPRAC.
Parameter: Any string of up to 20 characters may be supplied as the identifier for a BMPRAC.

```

***      Name      BMP      Unit Systems  Printer
*** BMPRAC      Type NCON NGQ      t-series  Engl Metr
  
```

Buttons: OK, Cancel, Apply, Help

Select the name 'SED-FRAC' and then click the **Add** button to add this table. The name 'SED-FRAC' will move to the list of optional tables present.

Table Status (34 Possible)

1 required table present.

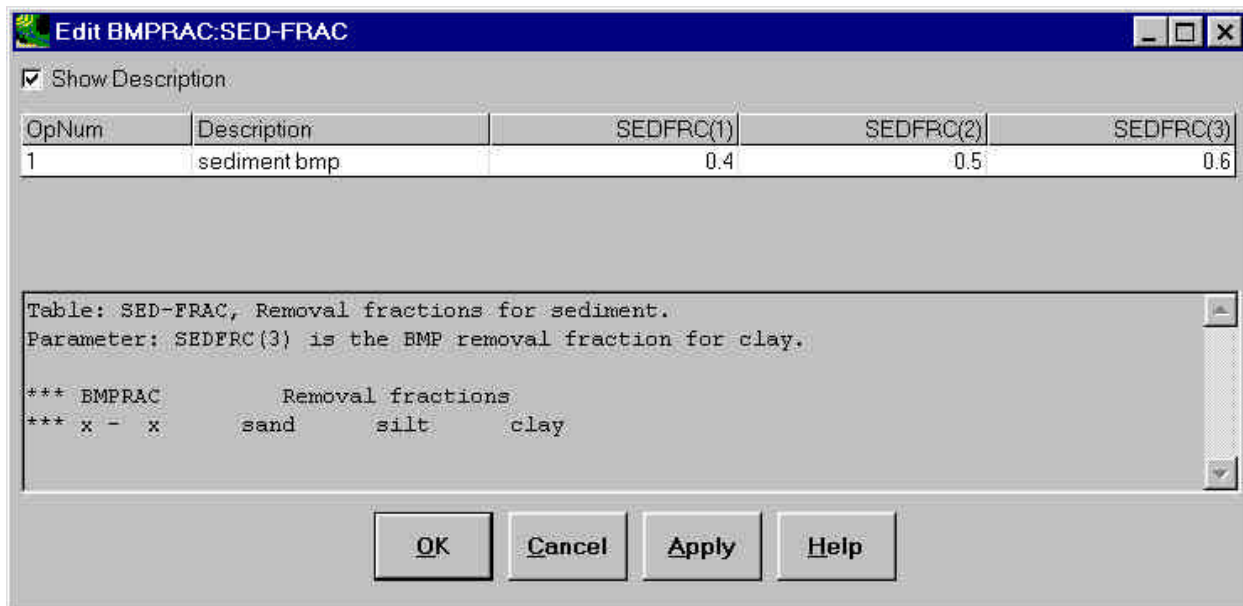
1 optional table present.

No required tables missing.

32 optional tables missing.

Buttons: OK, Cancel, Help, Add, Remove, Edit

Select the name 'SED-FRAC' and then click the **Edit** button to edit this table. The **Edit BMPRAC:SED-FRAC** window will appear. Enter 0.4 for SEDFRAC 1, 0.5 for SEDFRAC 2, and 0.6 for SEDFRAC 3. These numbers represent the removal fractions for sand, silt, and clay, respectively. Click the **OK** button to return to the **Edit Operation** window.



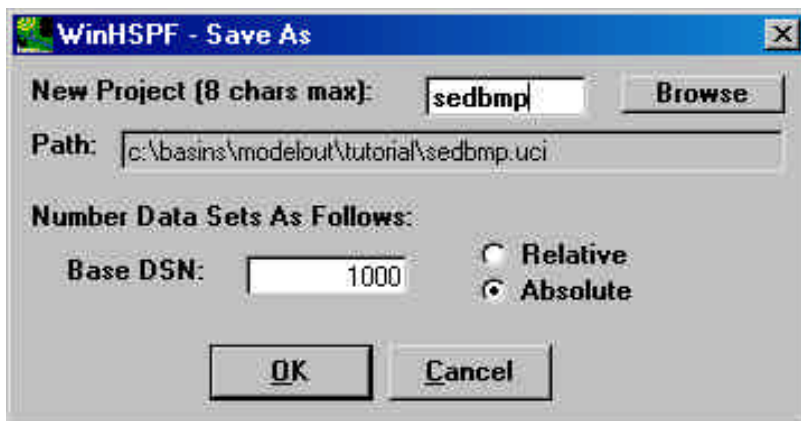
The **Edit BMPRAC:SED-FRAC** dialog box is shown. It has a title bar with a green icon and standard window controls. A checkbox labeled **Show Description** is checked. Below it is a table with five columns: **OpNum**, **Description**, **SEDFRC(1)**, **SEDFRC(2)**, and **SEDFRC(3)**. The first row contains the values 1, sediment bmp, 0.4, 0.5, and 0.6. Below the table is a text area containing the following text:

```
Table: SED-FRAC, Removal fractions for sediment.  
Parameter: SEDFRC(3) is the BMP removal fraction for clay.  
  
*** BMPRAC      Removal fractions  
*** x - x      sand      silt      clay
```

At the bottom are four buttons: **OK**, **Cancel**, **Apply**, and **Help**.

OpNum	Description	SEDFRC(1)	SEDFRC(2)	SEDFRC(3)
1	sediment bmp	0.4	0.5	0.6

From the **Edit Operation** window, click the **OK** button to return to the main WinHSPF window. We have now completed the process of adding a watershed management practice. To save the project with the new BMP, click on the **File** menu, and select the **Save As** option. Enter the name of the new sediment BMP UCI file, and click the **OK** button.



The **WinHSPF - Save As** dialog box is shown. It has a title bar with a green icon and standard window controls. The **New Project (8 chars max):** field contains **sedbmp** and a **Browse** button is to its right. The **Path:** field contains **c:\basins\modelout\tutorial\sedbmp.uci**. Below these is the **Number Data Sets As Follows:** section, which includes a **Base DSN:** field with the value **1000** and two radio buttons: **Relative** (unselected) and **Absolute** (selected). At the bottom are **OK** and **Cancel** buttons.

New Project (8 chars max): sedbmp **Browse**

Path: c:\basins\modelout\tutorial\sedbmp.uci

Number Data Sets As Follows:

Base DSN: 1000 ☐ Relative ☒ Absolute

OK **Cancel**